UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

Memorandum

SUBJECT: Use of Disulfoton on Bell and Pimento Peppers (Barcode D278640)

FROM: Colwell A. Cook, Entomologist
Herbicide and Insecticide Branch

Istanbul Yusuf, Economist
Economic Analysis Branch
Biological and Economic Analysis Division (7503C)

THROUGH: David Brassard, Senior Entomologist
Arnet Jones, Chief
Herbicide and Insecticide Branch

Arthur Grube, Senior Economist
David Widawsky, Acting Chief
Economic Analysis Branch

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TO: Christina Scheltema, Chemical Review Manager
Betty Shackleford, Chief
Reregistration Branch 3
Special Review and Reregistration Division (7508C)

CC: Denise Keehner, Director
Biological and Economic Analysis Division

Introduction

Special Review and Reregistration Division has requested that the Biological and Economic Analysis Division (BEAD) examine the use of disulfoton on sweet peppers and pimentos in response to an inquiry from the California Pepper Commission. The Commission claims that use of disulfoton on sweet peppers and pimentos is the same as on chili peppers. BEAD investigated the claim and the results follow.

Summary

Production practices and pest control of bell peppers and pimentos are the same for chili peppers. Approximately equal acreages of bell and chili peppers in California are treated with disulfoton. Application of disulfoton is shank injected of the liquid formulation as a side-dress when the plants are 4-5 weeks old. The primary insect pest on peppers is the green peach aphid which also transmits a mosaic viral disease that kills the plants.

Background

Peppers

Bell or sweet, chili or hot, and pimiento peppers are *Capsicum annuum*, L. All domesticated peppers are varieties of *C. annuum*. There is a wide variety of fruit color and shapes. The bell or sweet pepper has a large blocky fruit with 3 or 4 lobes and is harvested as mature green fruit. Many colors of fruit have been introduced into the commercial markets. Chili, chile, hot, cayenne peppers are tapered, slender, thin walled and highly pungent. Chili peppers are usually harvested when the fruit is red. Pimiento (pimento) are large, cone- or heart-shaped, thick-walled fruit usually are not pungent and harvested when fully red (Rubatzky and Yamaguchi, 1997).

In 2000, the US harvested 70,650 acres of bell peppers, California harvested 41% of the total. In 2000, the US harvested 31,400 acres of chili peppers, New Mexico harvested 57%, and California harvested 12% of the total. NASS has not surveyed pimento pepper production. Nearly 2,000 acres of bell peppers, about 1,600 acres of chili peppers, and 37 acres of pimento peppers in California were treated with disulfoton in 1998. New Mexico applies nearly 4,400 lbs of disulfoton to its peppers. For all peppers there is one application at a median rate of 2 lbs ai/acre (2001 Agricultural Statistics, EPA proprietary data).

Green Peach Aphid

In bell peppers, the primary insect pest driving disulfoton use is the green peach aphid, *Myzus persicae* (Sulzer). This insect is found throughout the world and attacks over 800 species of plants, including all solanaceous crops such as peppers. This insect vectors 50 plant viral diseases (Davidson and Lyon, 1987). In peppers it transmits a mosaic virus that rapidly kills the plant. This aphid prefers shade-grown plants (Davidson and Lyon, 1987); therefore, the foggy Salinas Valley is prime habitat as also provides numerous alternative hosts. This insect is notorious for developing resistance to insecticides, therefore having several compounds available is necessary for insecticide resistance management. Currently, disulfoton remains efficacious to the green peach aphid.

Symphylans

The garden symphylan, though not an insect, is becoming a problem for pepper growers in California. These pests feed on the root systems of many vegetables, small fruits, and speciality crops like mint. Control of symphylans is difficult due to their vertical and lateral movement in the soil. Some control may be gained by a 2 to 3 week flood in the spring or fall or by tilling the soil in the spring (Berry, 1998). The former is impractical in most situations and the latter is not possible in reduced- or no- till situations.

Chemical Use

In bell and pimento peppers, disulfoton is shank injected as a liquid side-dress when the plants are around 4 to 5 weeks old (Fisher, Chuck, personal communication). Mr. Chuck said that growers are already set-up with closed cabs and closed systems for the liquid formulation of disulfoton. He has no idea how to use or apply the granular formulation. He is concerned about equipment costs and whether the granules would be efficacious long enough to protect peppers from the aphids and viral disease (Chuck, personal communication).

Other compounds registered for use in bell peppers for green peach aphid are imidacloprid, diazinon, dimethoate, malathion and pyrethrins. Neither diazinon nor malathion is very efficacious against the green peach aphid. Dimethoate is frequently used and much less costly, but in some areas of CA and NM it is no longer effective for aphid control. Use of imidacloprid has been increasing, but, again, in some areas of CA control of this pest has been less than satisfactory. Pyrethroids do not fit well with integrated pest management (IPM) strategies since they will annihilate the predators and parasitoids as well.

Farm Size

According to Mr. Fisher, most of the members of the CA Pepper Commission farm approximately 200-300 acres. Bell peppers or pimentos account for anywhere from 50 to 100 acres. Most growers plant 3 vegetables, commonly

one third of their acreage in peppers, one third in lettuce and a third in broccoli. Nearly 50% of the pepper growers use commercial applicators to apply disulfoton (Ludwig, personal communication).

Progress

The California Pepper Commission was formed several years ago in response to pressure from the green peach aphid and the mosaic virus. They have been actively supporting research to identify resistant cultivars to the mosaic virus. Although they have not been successful in attaining their goals, they are interested in reducing the pesticides used in their industry (Fisher, personal communication).

References

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